**Endothermic and Exothermic Reactions**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_

**Purpose** - What is the difference between endothermic and exothermic reactions?

**Procedure**

Reaction #1: Teacher Demo

- Add one dropper-full of water to a small piece of calcium metal

Reaction #2: Teacher Demo

- Add a small amount of ammonium thiocyanate to a small amount of barium hydroxide.

Reaction #3:

- Put one pellet of sodium hydroxide into the test tube

- Add one dropper-full of water

Reaction #4:

- Put about 1 cm of calcium chloride into the test tube

- Add one dropper-full of water

Reaction #5:

- Put about 1 cm of sodium bicarbonate into the test tube

- Add one dropper-full of water

Reaction #6:

- Put about 1 cm of ammonium nitrate into the test tube

- Add one dropper-full of water

**Observations** (describe what happens – use the tables and questions below)

Data Table #1: Reaction #1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Reactants | | Products | |
| Name | Calcium (s) | Water (l) | Calcium hydroxide | Hydrogen (g) |
| Formula |  |  |  | H2 |
| Properties |  |  |  |  |
| Bohr Diagram |  | OMIT | OMIT | OMIT |

Was heat released or absorbed? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Data Table #2: Reaction #2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Reactants | | Products | |
| Name | Ammonium thiocyanate (s) | Barium hydroxide (s) | Barium thiocyanate (s) | Ammonia (g) |
| Formula | NH4SCN |  |  | NH3 |
| Properties |  |  |  |  |
| Bohr Diagram | OMIT | OMIT | OMIT | OMIT |

Was heat released or absorbed? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Data Table #3: Reaction #3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Reactants | | Products | |
| Name | Sodium hydroxide (s) | Water (l) | Sodium ion (aq) | Hydroxide ion (aq) |
| Formula |  |  |  |  |
| Properties |  |  | OMIT | OMIT |
| Bohr Diagram | OMIT | OMIT |  | OMIT |

Was heat released or absorbed? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Data Table #4: Reaction #4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Reactants | | Products | |
| Name | Calcium chloride (s) | Water (l) | Calcium ion (aq) | Chloride ion (aq) |
| Formula |  |  |  |  |
| Properties |  |  | OMIT | OMIT |
| Bohr Diagram | OMIT | OMIT |  |  |

Was heat released or absorbed? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Data Table #5: Reaction #5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Reactants | | Products | |
| Name | Sodium bicarbonate (s) | Water (l) | Sodium ion | Bicarbonate ion |
| Formula |  |  |  |  |
| Properties |  |  | OMIT | OMIT |
| Bohr Diagram | OMIT | OMIT | OMIT | OMIT |

Was heat released or absorbed? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Data Table #6: Reaction #6

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Reactants | | Products | |
| Name | Ammonium nitrate (s) | Water (l) | Ammonium ion | Nitrate ion |
| Formula |  |  |  |  |
| Properties |  |  | OMIT | OMIT |
| Bohr Diagram | OMIT | OMIT |  | OMIT |

Was heat released or absorbed? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Results** (summarize your observations in sentence form)

Reaction #1:

-In reaction #1, calcium reacted with water to produce calcium hydroxide and hydrogen gas. This was

an exothermic reaction that produced heat.

Reaction #2:

Reaction #3:

Reaction #4:

Reaction #5:

Reaction #6:

**Conclusion** (answer the question posed in the purpose)